Claims

We Claim:

1. A wavelength-selective optical switch comprising:

a first waveguide and a second waveguide;
at least one of said first and second waveguides comprising an electro-optic material having a set of Bragg gratings disposed therein for interfacing between said first and second waveguides; and
means for generating an electrical field across said electro-optical material for changing an electro-optical characteristic of said electro-optic material for effecting an optical switching function corresponding to said electrical field.

2. The wavelength-selective optical switch of claim 1 wherein:

said means for generating an electrical field is provided for turning on and off a transmission of an optical signal from said first waveguide to said second waveguide.

3. The wavelength-selective optical switch of claim 1 wherein:

said means for generating an electrical field is provided for turning on and off a transmission of an optical signal of a selective wavelength from said first waveguide to said second waveguide.

4. The wavelength-selective optical switch of claim 1 wherein:

said means for generating an electrical field is provided for turning on and off a transmission of an optical signal of a tunable wavelength by changing said electrical field from said first waveguide to said second waveguide.

5. The wavelength-selective optical switch of claim 1 wherein:

said first waveguide intersecting said second waveguide and set of Bragg gratings disposed near an intersection between said first and second waveguides.

6. The wavelength-selective optical switch of claim 1 wherein:

said electro-optical material comprising a lanthanum-doped lead zirconate titanate (PLZT).

7. The wavelength-selective optical switch of claim 1 wherein:

said electro-optical material comprising a $LiNbO_3$.

8. The wavelength-selective optical switch of claim 1 wherein:

said electro-optical material comprising a solid material having a tunable electro-optical characteristic.

9. The wavelength-selective optical switch of claim 1 wherein:

said electro-optical material comprising a non-poled material having a tunable electro-optical characteristic.

10. The wavelength-selective optical switch of claim 1 wherein:

said electro-optical material comprising a ceramic material having a tunable electro-optical characteristic.

11. The wavelength-selective optical switch of claim 1 wherein:

said electro-optical material comprising a polycrystalline material having a tunable electro-optical characteristic.

12. The wavelength-selective optical switch of claim 1 wherein:

said electro-optical material comprising a non-ferroelectric material having a tunable electro-optical characteristic.

13. The wavelength-selective optical switch of claim 1 wherein:

said electro-optical material comprising a liquid crystal material having a tunable electro-optical characteristic.

14. The wavelength-selective optical switch of claim 1 wherein:

said electro-optical material comprising a relaxor material having a tunable electro-optical characteristic.

15. The wavelength-selective optical switch of claim 1 wherein:

said means for generating an electrical field across said electro-optical material for changing an refraction index of said electro-optic material for effecting an optical switching function corresponding to said electrical field.

16. A wavelength-selective optical device comprising:

a set of Bragg gratings formed with an electro-optic material for electrically tuning and selecting a wavelength to transmit through said set of Bragg gratings.

17. The wavelength-selective optical device of claim 16 further comprising:

a means for applying an electric field over said set of electro-optic material for tuning and selecting a wavelength.

18. The wavelength-selective optical device of claim 16 wherein:

said electro optic material disposed in a waveguide.

19. The wavelength-selective optical device of claim 16 wherein:

said electro optic material disposed in a waveguide coupled to and controlling a signal transmission from an input waveguide to an output waveguide.

20. A method for configuring a wavelength-selective optical device comprising:

electrically tuning and selecting a wavelength to transmit through a set of Bragg gratings formed with an electro-optic material.

21. The method of claim 20 further comprising a step of:

applying an electric field over said set of Bragg gratings for tuning and selecting a wavelength.

22. The method of claim 21 further comprising a step of:

forming said set of Bragg gratings in a waveguide comprising said electro optic material.

23. The method of claim 20 further comprising a step of:

forming said set of Bragg gratings in a waveguide comprising said electro optic material and coupling said waveguide to an input waveguide to an output waveguide for controlling a signal transmission.

24. A wavelength-selective optical switch comprising:

a first waveguide and a second waveguide;
at least one of said first and second waveguides comprising an electro-optic material having a set of Bragg gratings disposed therein for interfacing and wavelength-selecting an optical signal transmission between said first and second waveguides.

25. The wavelength-selective optical switch of claim 24 wherein:

one of said first and second waveguides comprising an silicon oxide waveguide.

26. The wavelength-selective optical switch of claim 24 further comprising:

means for generating a variable electrical field across said electro-optical material for changing and tuning an electro-optical characteristic of said Bragg gratings for effecting an optical switching and wavelength tuning function corresponding to said variable electrical field.

27. The wavelength-selective optical switch of claim 24 wherein:

said electro-optical material comprising a lanthanum-doped lead zirconate titanate (PLZT).

28. The wavelength-selective optical switch of claim 24 further comprising:

said first intersecting said second waveguide with said set of Bragg gratings disposed near an intersection between said first and second waveguide.

29. The wavelength-selective optical switch of claim 24 further comprising:

a substrate for supporting one of said first and second waveguides; and

means for generating an electrical field in parallel to a planar direction of said substrate across said electro-optical material for changing an electro-optical characteristic of said Bragg gratings for effecting a change of an optical signal transmission corresponding to said electrical field.

30. The wavelength-selective optical switch of claim 24 further comprising:

a substrate for supporting one of said first and second waveguides; and

means for generating an electrical field along a non-parallel direction relative to a planar direction of said substrate wherein said electrical field is applied across said electro-optical material for changing an electro-optical characteristic of said Bragg gratings for effecting a change of an optical signal transmission corresponding to said electrical field.

31. The wavelength-selective optical switch of claim 24 further comprising:

a substrate for supporting one of said first and second waveguides; and

means for generating an electrical field along a perpendicular direction relative to a planar direction of said substrate wherein said electrical field is applied across said electro-optical material for changing an electro-optical characteristic of said Bragg gratings for effecting a change of an optical signal transmission corresponding to said electrical field.

32. The wavelength-selective optical switch of claim 24 further comprising:

a substrate for supporting one of said first and second waveguides; and

said first intersecting said second waveguide with said set of Bragg gratings disposed near an intersection between said first and second waveguide wherein said first waveguide disposed vertically above said second waveguide along a direction perpendicular to a planar direction of said substrate.